Service Manual

ToneLab TT

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2nd Edition
Issued date: November 28th, 2003
Issued by: KORG INC.

INPUT
from POWER PCB

INPUT-1

INPUT-2

X 16

COMPARATER
for TUNER

CODEC1

CODEC2

from POWER PCB
TUBE

for POWER PCB
TUBE

for POWER PCB
OUTPUT

X 2.7

X 2.7

POWER SUPPLY

BACK LIGHT

VR

SHIFT REGISTER

VR3 DRIVE
VR4 TONE
VR5 LEVEL
VR6 TREBLE
VR7 GAIN
VR8 MIDDLE
VR9 VR GAIN
VR10 BASS
VR11 CH VOLUME
VR12 PRESENCE

SW Matrix

UTILITY
GLOBAL
WRITE
TUNER
PEDAL
MOD
DELAY
REVERB
BANK UP
BANK DOWN
TAP

VR1 PEDAL
VR2 CABINET

AMP

7segLED

LED Matrix

DSP1

DRAM
16Mbit

CPU

DSP2

EEPROM

LCD

VOX BUS
MIDI

RESET

DAC

OPTICAL
OUT

Master
CLOCK

8MHz

22.5792MHz

CLOCK

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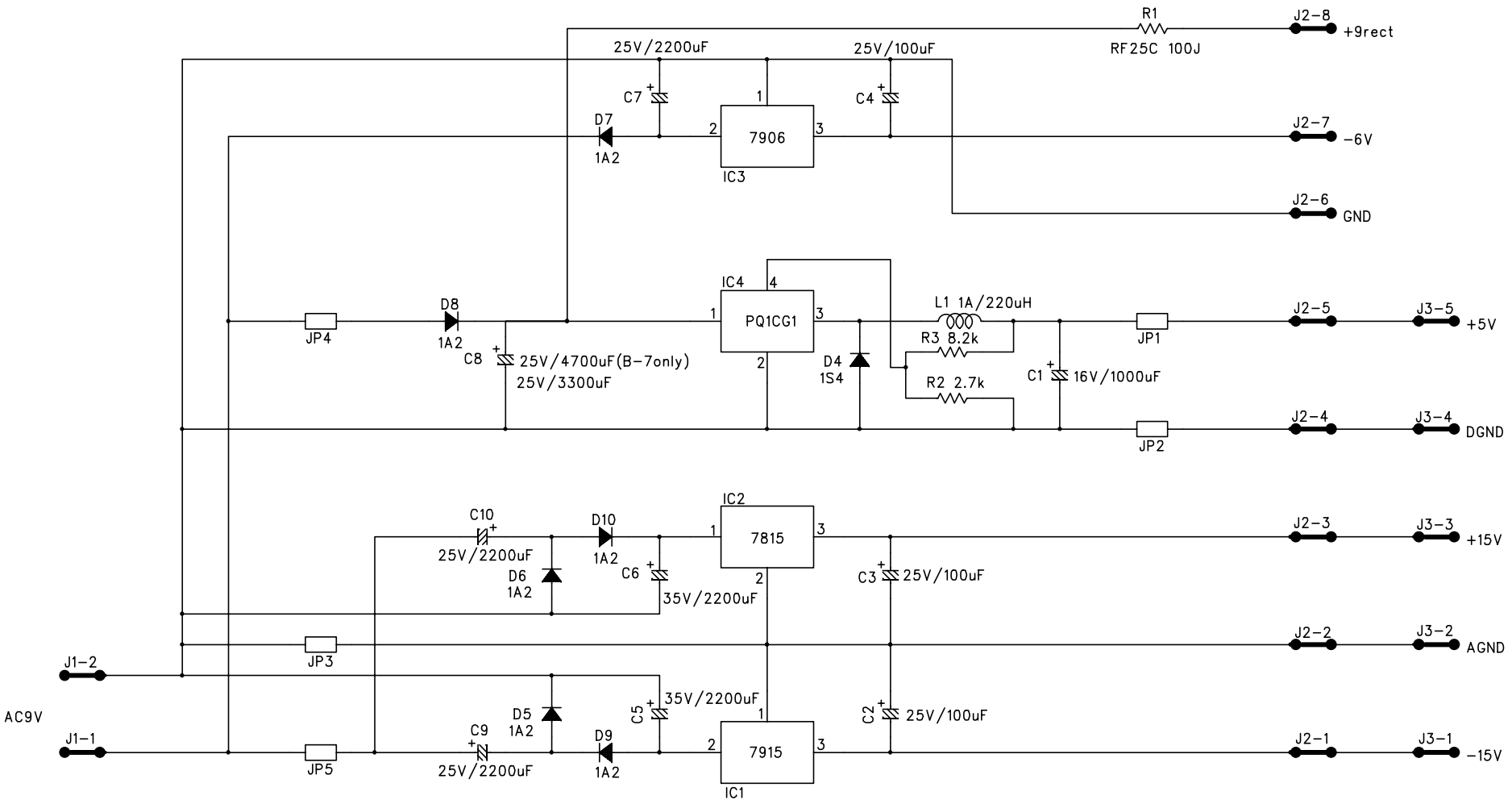
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL	X-2540
Ichikawa	Ichikawa		TITLE	MAIN PCB
KORG	DRAWING NO.	KOD-A30554	DATE	'03.07.01



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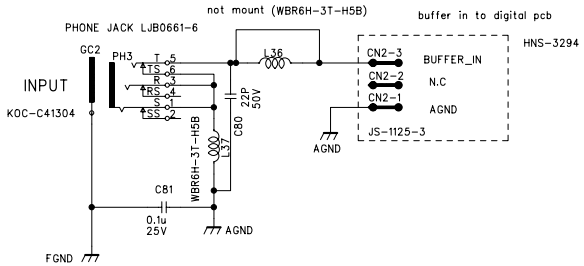
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL ToneLab (X-2540)
			TITLE KLM-2429 POWER PCB
KORG	DRAWING NO. KOD-A40552		DATE '03.07.07



KLM-2427A

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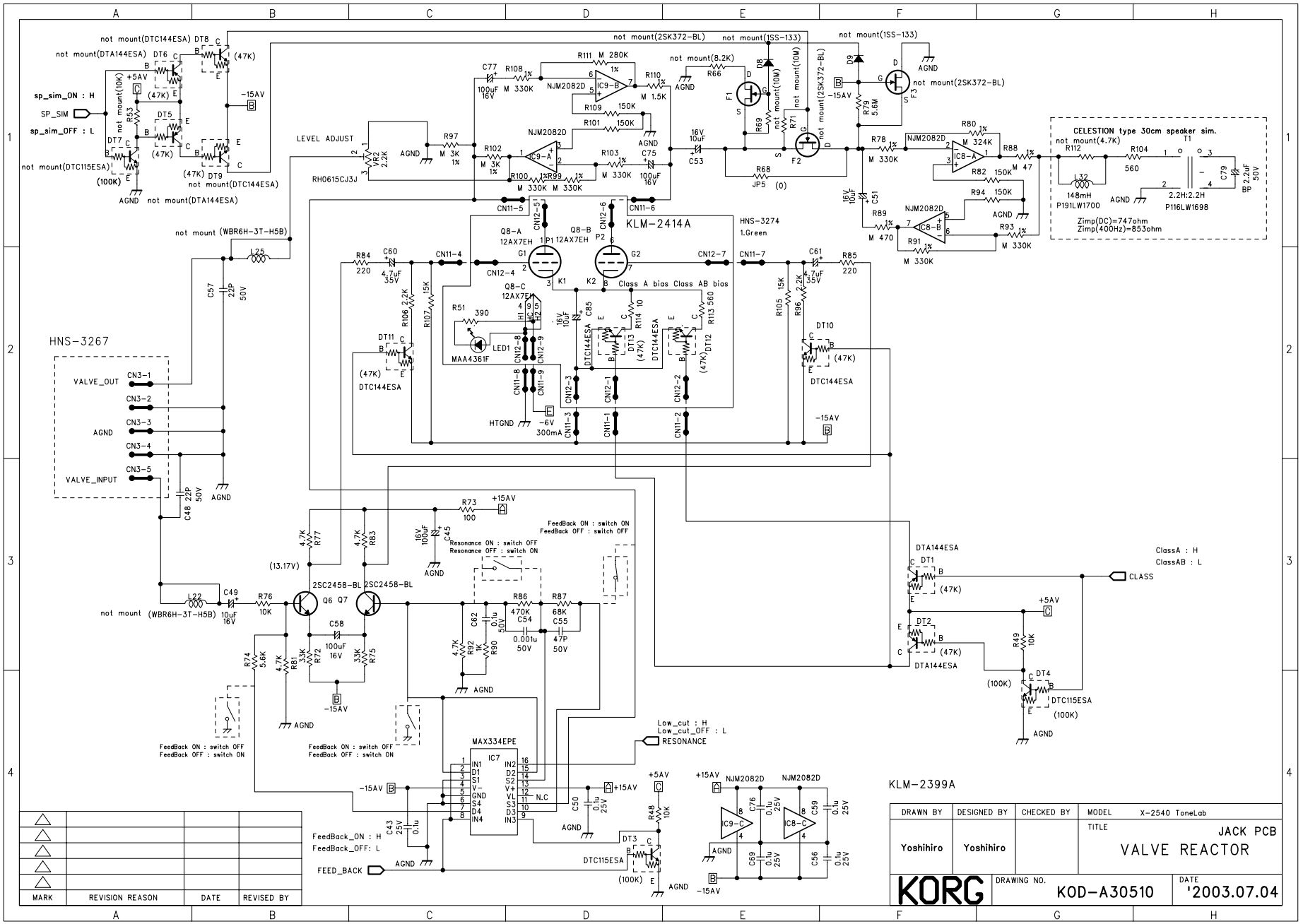
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL X-2540 VOX ToneLab
Yoshihiro	Yoshihiro		TITLE INPUT PCB ANALOG INPUT

KORG | DRAWING NO. KOD-A30509 | DATE '2003.07.04


KLM-2414A
HNS-3274
1.Green
HNS-3267
KLM-2399A
VALVE_OUT
VALVE_INPUT
AGND
+5AV
-15AV
-15AV
(13.17V)
-6V
300mA
HTGND
Class A bias Class AB bias
LEVEL ADJUST
RH0615CJ3J
MAA4361F
2SC2458-BL
MAX334EPE
NJM2082D
DTC144ESA
DTC115ESA
CELESTION type 30cm speaker sim.
not mount(4.7K)
148mH
P191LW1700
2.2H:2.2H
P116LW1698
Zimp(DC)=747ohm
Zimp(400Hz)=853ohm
not mount (WBR6H-3T-H5B)
not mount(DTC144ESA) DT8
not mount(DTA144ESA) DT6
not mount(DTC115ESA)
not mount(DTA144ESA)
not mount(2SK372-BL)
not mount(1SS-133)
not mount(8.2K)
not mount(10M)
sp_sim_ON : H
sp_sim_OFF : L
SP_SIM
FeedBack ON : switch ON
FeedBack OFF : switch OFF
Resonance ON : switch OFF
Resonance OFF : switch ON
FeedBack ON : switch OFF
FeedBack OFF : switch ON
FeedBack_ON : H
FeedBack_OFF: L
FEED_BACK
Low_cut : H
Low_cut_OFF : L
RESONANCE
ClassA : H
ClassAB : L
CLASS
JP5 (0)
HTGND
Q8-A 12AX7EH
Q8-B 12AX7EH
Q8-C 12AX7EH
Q6 Q7
F1
F2
F3
LED1
IC7
IC8-A
IC8-B
IC9-A
IC9-B
IC9-C
DT1
DT2
DT3
DT4
DT10
DT12
DT13
T1
JACK PCB
VALVE REACTOR
KORG
KOD-A30510
'2003.07.04
Yoshihiro
Yoshihiro
X-2540 ToneLab
MARK
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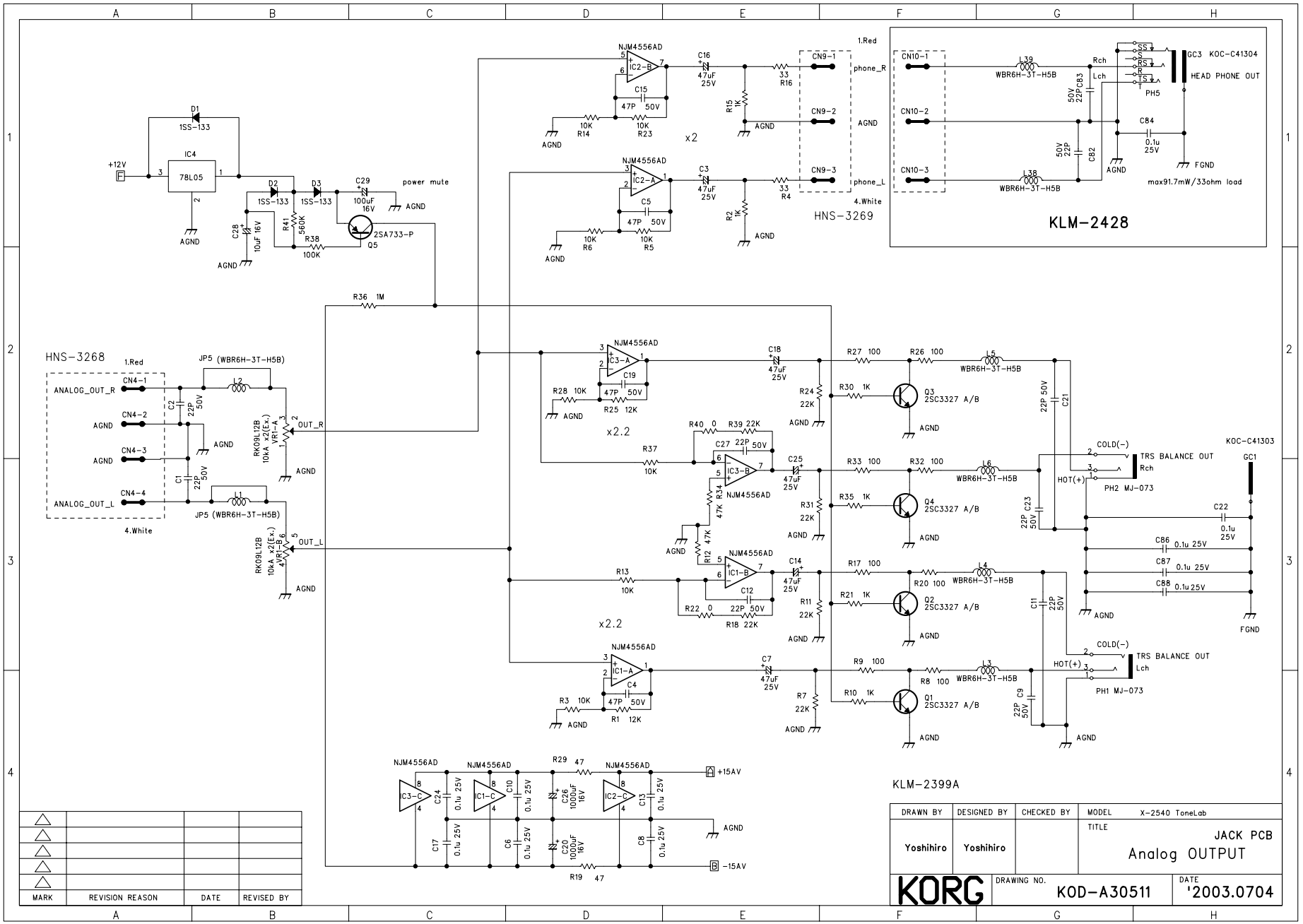
DATE
REVISED BY
DRAWN BY
DESIGNED BY
CHECKED BY
MODEL
TITLE
DRAWING NO.
DATE


HNS-3268
HNS-3269
KLM-2428
KLM-2399A
NJM4556AD
78L05
2SA733-P
2SC3327 A/B
WBR6H-3T-H5B
JP5 (WBR6H-3T-H5B)
TRS BALANCE OUT
HEAD PHONE OUT
max91.7mW/33ohm load
+12V
power mute
+15AV
-15AV
AGND
FGND
x2
x2.2
DRAWN BY
DESIGNED BY
CHECKED BY
MODEL
X-2540 ToneLab
TITLE
JACK PCB
Analog OUTPUT
Yoshihiro
KORG
DRAWING NO.
KOD-A30511
DATE
'2003.0704
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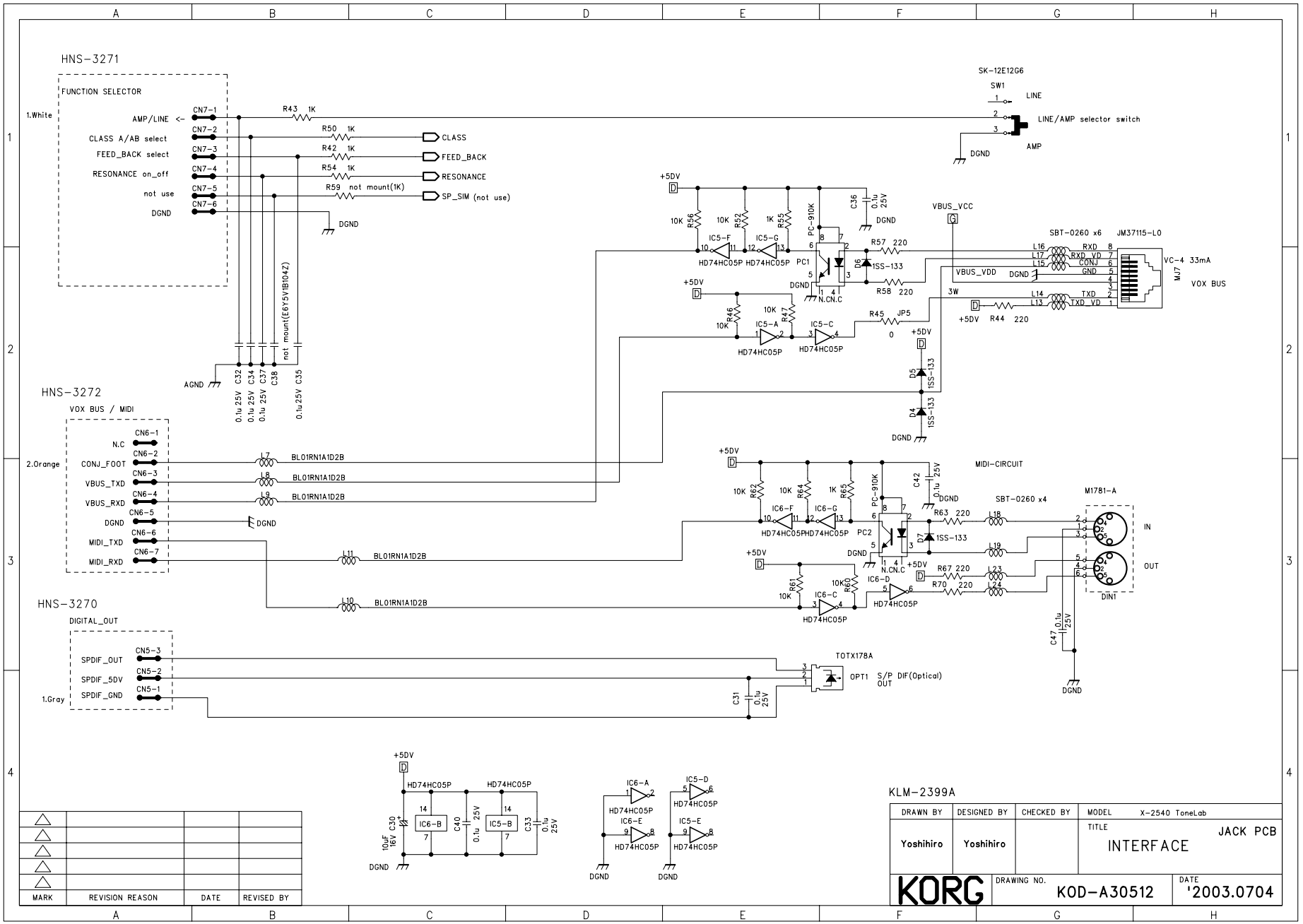

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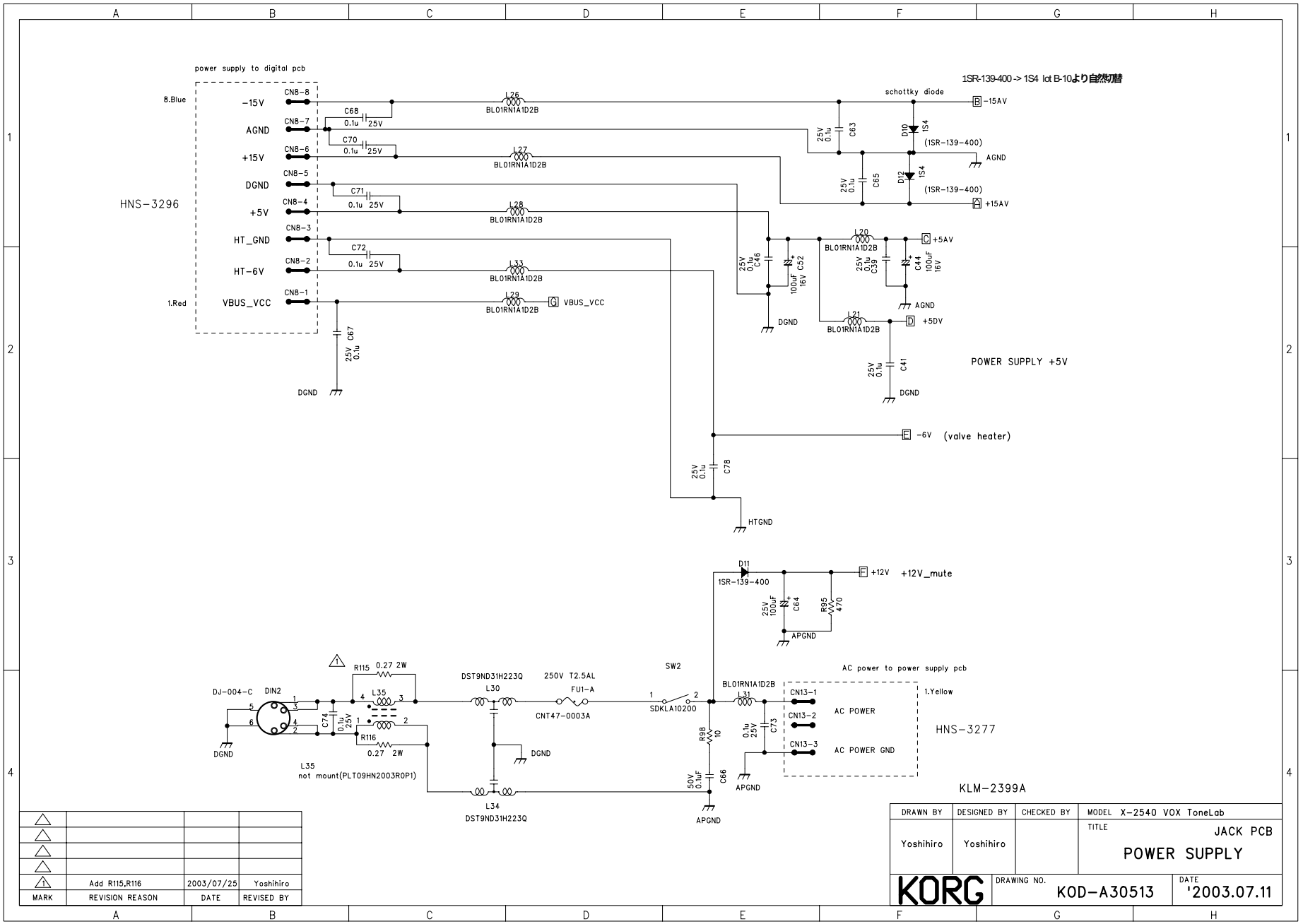
KLM-2399A

DRAWN BY	DESIGNED BY	CHECKED BY	MODEL X-2540 ToneLab
Yoshihiro	Yoshihiro		TITLE INTERFACE JACK PCB
KORG	DRAWING NO. KOD-A30512		DATE '2003.0704



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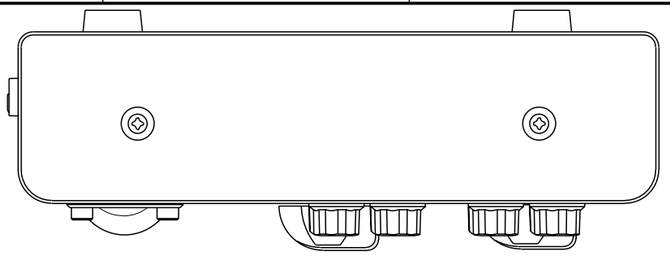
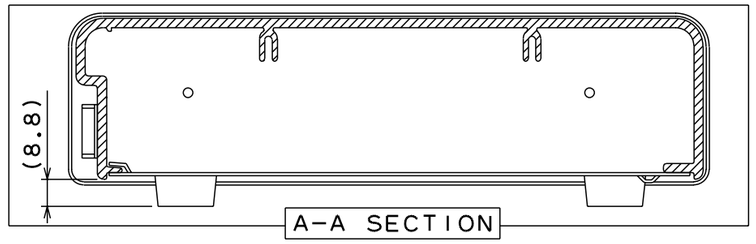
1	Add R115,R116	2003/07/25	Yoshihiro

DRAWN BY	DESIGNED BY	CHECKED BY	MODEL X-2540 VOX ToneLab
Yoshihiro	Yoshihiro		TITLE JACK PCB POWER SUPPLY

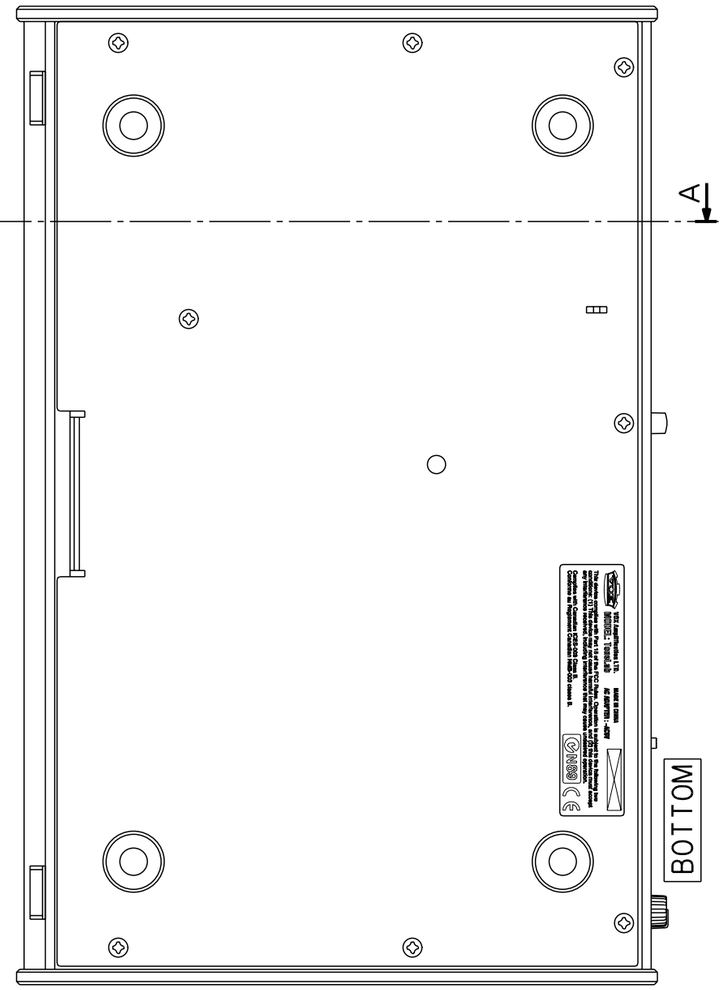
KORG | DRAWING NO. KOD-A30513 | DATE '2003.07.11

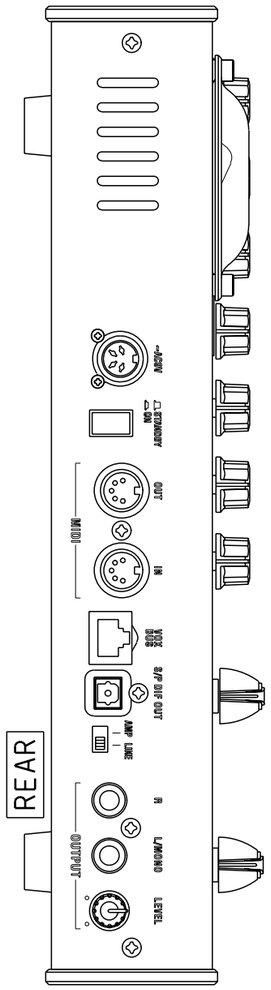
R-SIDE

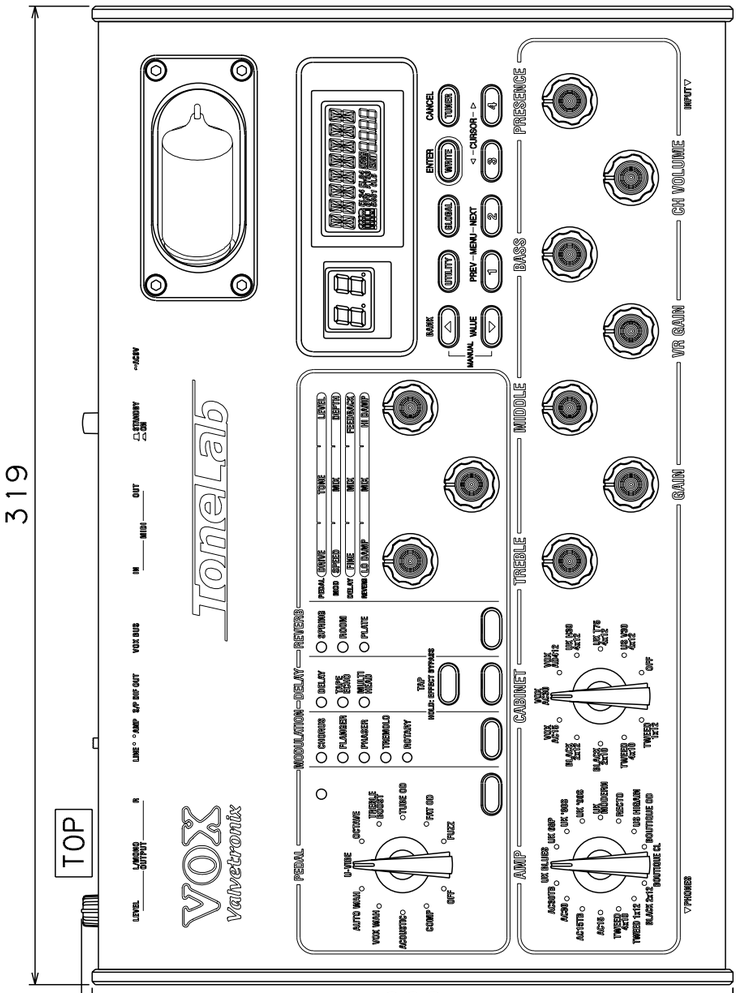


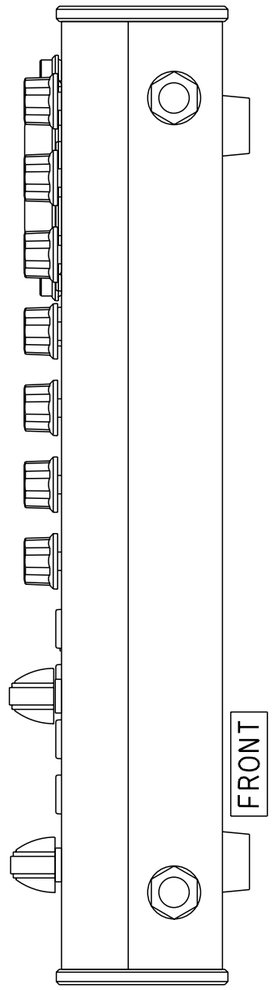


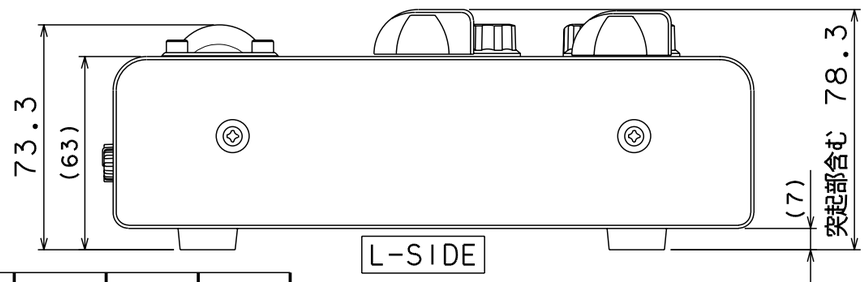
A–A SECTION











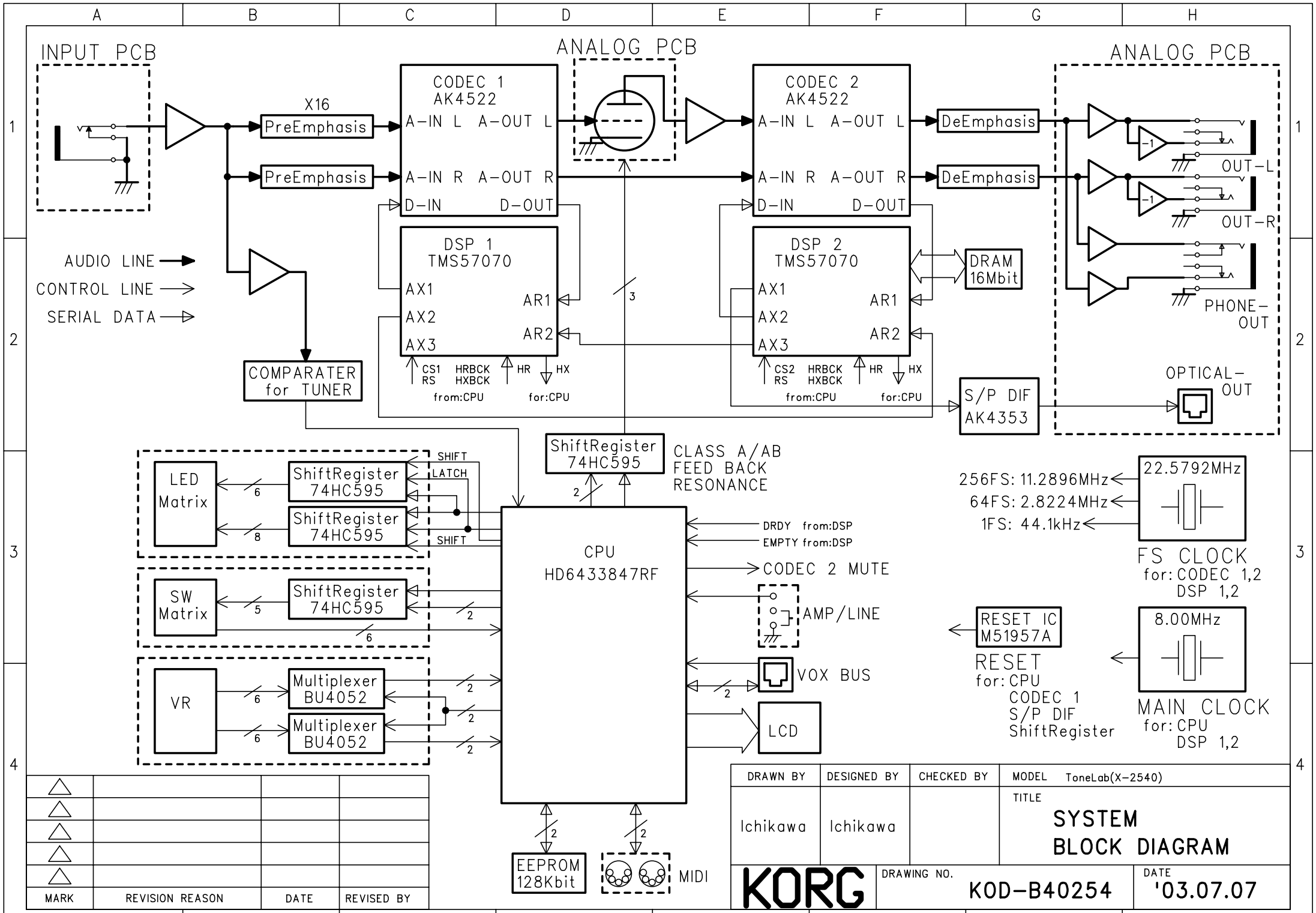
■製品外形寸法 （mm）			
実測寸法	(W) x (D) x (H)	カタログ／取説公表寸法	WxDxH
突起部除く	319 x 209 x 73.3	突起部除く	319 x 209 x 74
突起部含む	319 x 212.5 x 78.3	突起部含む	319 x 213 x 79
■製品重量			
実測値		カタログ／取説公表値	
2.45kg		2.5kg	

REVISAL MARK	REVISAL REASON	REVISAL DATE	REVISED BY	APPROVED
△				

COMMERCIAL TOLERANCE ± mm

1	X-2540					
MODEL		SPECIFICATION			PARTS NAME	PARTS No.
WEIGHT: *** (g)	DRAWN	CHECKED	APPROVED	TITLE	2540 outward form 2540外形図	試作図
	SAKAMOTO 03/07/01		ADACHI			金型手配図
						金型発注図
KORG KORG INC.		SCALE 1/2	DRAWING No. KOC-A30165			量産図面
						総合製作書用図面 ○

A3



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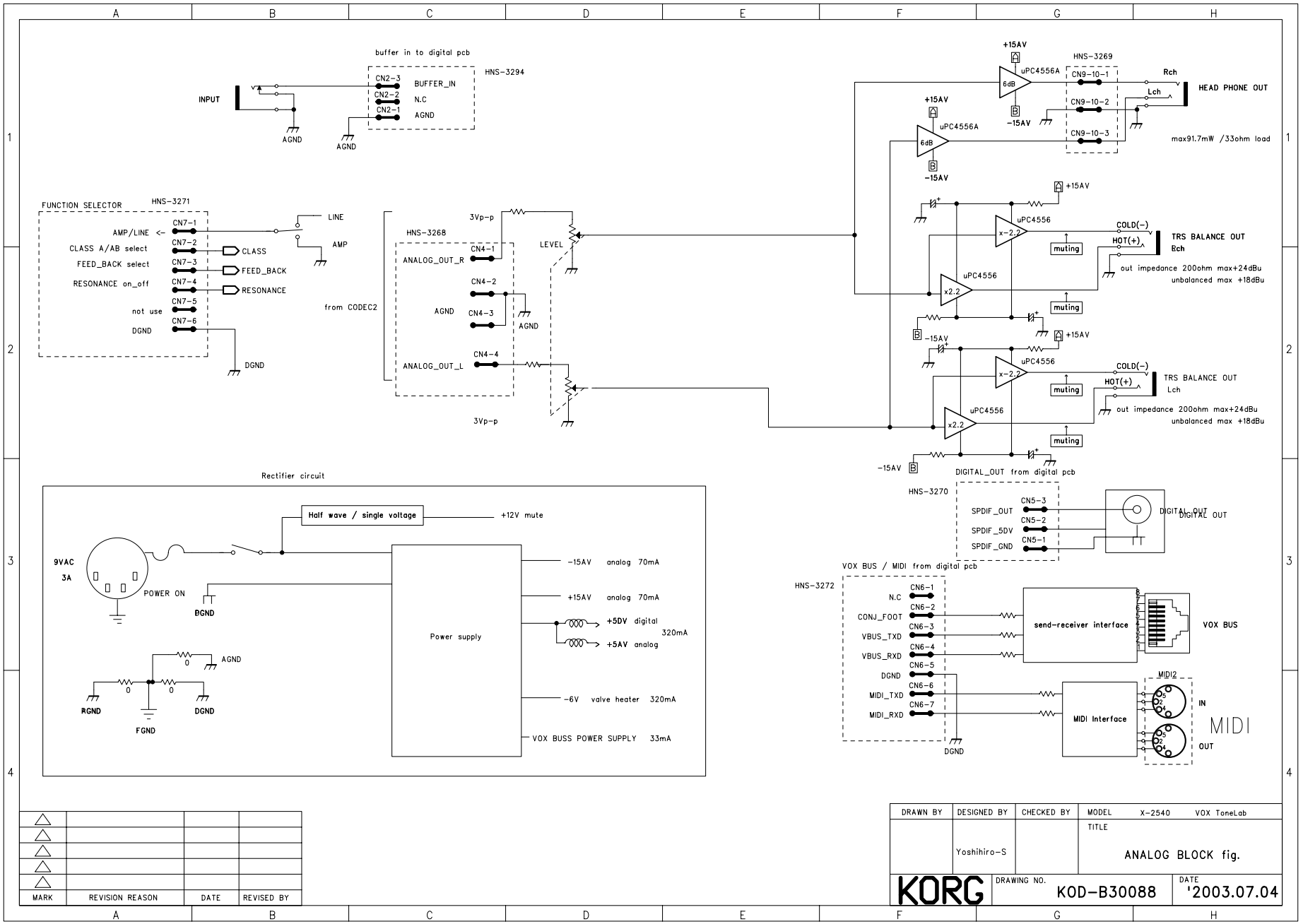
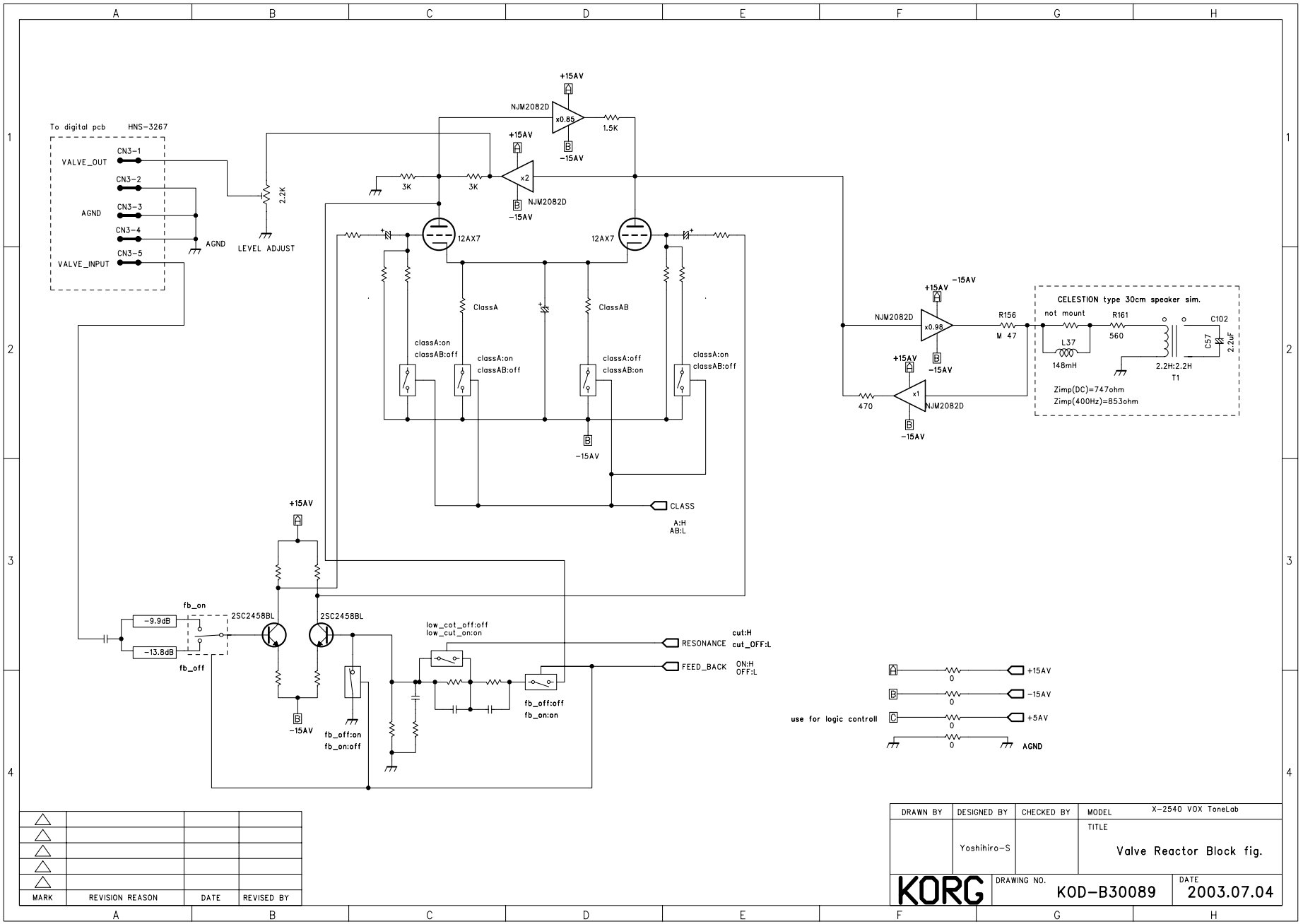
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL ToneLab(X-2540)
Ichikawa	Ichikawa		TITLE SYSTEM BLOCK DIAGRAM

KORG

DRAWING NO. KOD-B40254

DATE '03.07.07


buffer in to digital pcb
HNS-3294
INPUT
CN2-3
CN2-2
CN2-1
BUFFER_IN
N.C
AGND
AGND
AGND
+15AV
HNS-3269
uPC4556A
6dB
CN9-10-1
Rch
Lch
HEAD PHONE OUT
CN9-10-2
CN9-10-3
-15AV
max91.7mW /33ohm load
FUNCTION SELECTOR
HNS-3271
AMP/LINE
CLASS A/AB select
FEED_BACK select
RESONANCE on_off
not use
DGND
CN7-1
CN7-2
CN7-3
CN7-4
CN7-5
CN7-6
LINE
AMP
CLASS
FEED_BACK
RESONANCE
DGND
from CODEC2
HNS-3268
ANALOG_OUT_R
ANALOG_OUT_L
AGND
CN4-1
CN4-2
CN4-3
CN4-4
3Vp-p
LEVEL
3Vp-p
uPC4556
x-2.2
x2.2
muting
COLD(-)
HOT(+)
TRS BALANCE OUT
Rch
out impedance 200ohm max+24dBu
unbalanced max +18dBu
TRS BALANCE OUT
Lch
out impedance 200ohm max+24dBu
unbalanced max +18dBu
Rectifier circuit
Half wave / single voltage
+12V mute
9VAC
3A
POWER ON
DGND
Power supply
-15AV analog 70mA
+15AV analog 70mA
+5DV digital
+5AV analog
320mA
-6V valve heater 320mA
VOX BUSS POWER SUPPLY 33mA
AGND
RGND
DGND
FGND
DIGITAL_OUT from digital pcb
HNS-3270
SPDIF_OUT
SPDIF_5DV
SPDIF_GND
CN5-3
CN5-2
CN5-1
DIGITAL OUT
VOX BUS / MIDI from digital pcb
HNS-3272
N.C
CONJ_FOOT
VBUS_TXD
VBUS_RXD
DGND
MIDI_TXD
MIDI_RXD
CN6-1
CN6-2
CN6-3
CN6-4
CN6-5
CN6-6
CN6-7
send-receiver interface
VOX BUS
MIDI Interface
MIDI2
IN
OUT
MIDI
MARK
REVISION REASON
DATE
REVISED BY
DRAWN BY
DESIGNED BY
CHECKED BY
MODEL X-2540 VOX ToneLab
Yoshihiro-S
TITLE
ANALOG BLOCK fig.
KORG
DRAWING NO.
KOD-B30088
DATE
'2003.07.04



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DRAWN BY	DESIGNED BY	CHECKED BY	MODEL
	Yoshihiro-S		X-2540 VOX ToneLab

TITLE: Valve Reactor Block fig.

KORG

DRAWING NO. KOD-B30089

DATE 2003.07.04

ToneLab Test Mode

How to start and operate the test mode (LINE/AMP switch must be set to AMP):

TAP + PEDAL & POWER ON: Internal test, Operational part (knob, etc.) test
TAP + REVERB & POWER ON: MIDI test, Audio test
WRITE + 1 & POWER ON: Internal test (skip the terminal connection test)
<OPERATIONAL PART TEST>
WRITE + 2 & POWER ON: Operational part test
WRITE + UTILITY & POWER ON: Tube test
WRITE + 4 & POWER ON: Audio test

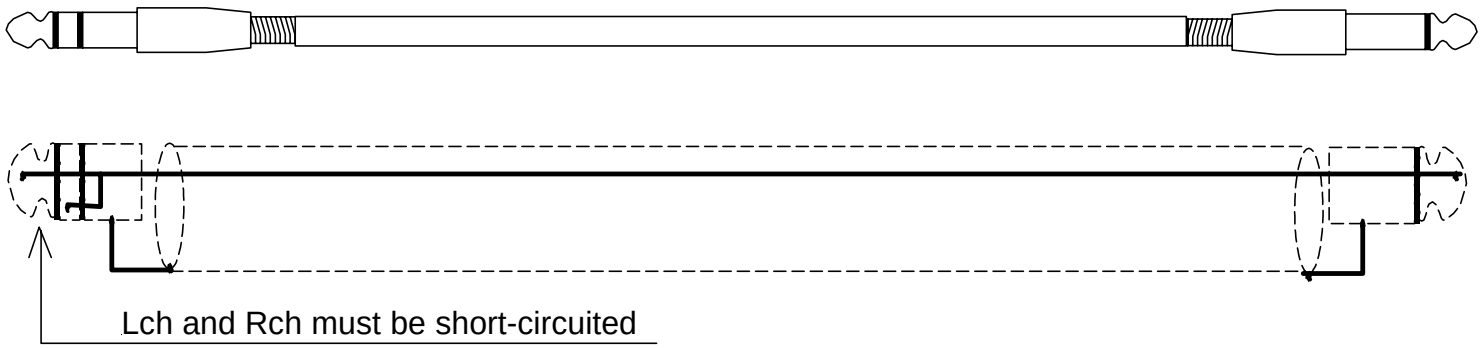
△ : ITEM UP
▽ : ITEM DOWN
4 : STEP UP
3 : STEP DOWN
PEDAL + 3: 2nd test for the step which was recognized as NG during the internal test
PEDAL + ▽ : 2nd test for the item which was recognized as NG during the internal test

NOTE1 : When starting any of the test modes which includes Internal Test, it is required to prepare a loop cable in your side. (You may need to make it by yourselves.)
Please refer to the diagram “CAM028”. Insert the stereo plug to the HEADPHONE terminal and monaural plug to the INPUT terminal.

NOTE 2: When you need to check the USB bus, please prepare a VC-4 (foot controller). Then, you may need anyone else who can start up the VC-4 as follows:

While pressing SW1 and SW3, power on the VC-4 when starting the above test on the ToneLab. It is required to connect the VC-4 and ToneLab with a cable, needless to say.

CAB028(STEREO-MONO)



PART CODE	PART NAME	NOTE	Q'TY
001239600	PCB ASSY KLM-2396/2430 TONELAB	M.PART	1
001239900	PCB ASSY KLM-2399/2414/27/28	M.PART	1
001242900	PCB ASSY KLM-2429 TONELAB	M.PART	1
304000010	TR 2SA733A T K (TR)	KLM-2399/2414/27/28	1
304000150	TR 2SC3327 A/B (TPE4)	KLM-2399/2414/27/28	4
304050180	DIGITAL TR DTC144EKA T146 (TS)	KLM-2399/2414/27/28	4
304050190	DIGITAL TR DTA144EKA T146 (TS)	KLM-2399/2414/27/28	2
304050250	DIGITAL TR DTC114EUA T106 (TS)	KLM-2396/2430	1
314001300	DIODE 1SS-133 T-77 (TA)	KLM-2399/2414/27/28	7
314003400	DIODE 1SR-139-400 (TA)	KLM-2399/2414/27/28	1
314003400	DIODE 1SR-139-400 (TA)	KLM-2399/2414/27/28	2
314031500	LED EL-15-21 SURC/S530-A2 (TS)	KLM-2396/2430	13
320004359	IC HD74HC05P	KLM-2399/2414/27/28	2
320004691	IC HD6433847RB37H	KLM-2396/2430	1
320009004	IC NJM-78L05A	KLM-2399/2414/27/28	1
320009058	IC NJM-7815FA	KLM-2429	1
320009059	IC NJM-7915FA	KLM-2429	1
320009077	IC NJM2082D	KLM-2399/2414/27/28	2
320013073	IC PQ1CG1	KLM-2429	1
320021156	IC TMS57070FFT	KLM-2396/2430	2
324001015	IC UPC4570G2-E2 (TS)	KLM-2396/2430	5
324003010	IC TC7WU04F TE12L (TS)	KLM-2396/2430	2
324004146	IC HD74HC595FPER (TS)	KLM-2396/2430	4
324004165	IC HD74HC4040FPEL	KLM-2396/2430	1
324004167	IC HD74HC4052FPER (TS)	KLM-2396/2430	2
324006007	IC MSM5118165D-60JSR1-9 (TS)	KLM-2396/2430	1
324007002	IC BA10358F-T1(2K) (TS)	KLM-2396/2430	1
324011032	IC M51957AFP	KLM-2396/2430	1
324018006	IC AK4522-VF-E2(TS)	KLM-2396/2430	2
324018011	IC AK4353VF-E2 (TS)	KLM-2396/2430	1
324043002	IC CA24WC128J_TE13	KLM-2396/2430	1
330002500	OPTICAL TRANSMITTER TOTX178A	KLM-2399/2414/27/28	1
330003100	PHOTO COUPLER PC910LKNSZ	KLM-2399/2414/27/28	2
334000500	SB COIL SBT-0260 TF (TR)	KLM-2399/2414/27/28	9
335010600	CRYSTAL OSC HC-49US 8.00MHZ	KLM-2396/2430	1
335012200	CRYSTAL OSC HC-49US 22.5792MHZ	KLM-2396/2430	1
350002222	TRIMER RH0615C J3 2.2K	KLM-2399/2414/27/28	1
373010300	SLIDE SW SK-12E12G6	KLM-2399/2414/27/28	1
375014800	PSW SDKLA10200	KLM-2399/2414/27/28	1
450003900	PHONE JACK LJB0661-6	KLM-2399/2414/27/28	2
454012707	DIN SOCKET DJ-004-C	KLM-2399/2414/27/28	1
480010430	DIN SOCKET M1781-A	KLM-2399/2414/27/28	1
500022500	CASE LEG FF-004	M.PART	4
515400100	FUSE HOLDER CNT47-0003A(TR)	KLM-2399/2414/27/28	2
620018200	POWER SW KNOB KOC-E40224	M.PART	1
620040700	KNOB P423-90F(X-9100) E40519-1	M.PART	1
630037200	2540 SHIELD SHEET KOC-F30095	M.PART	1
630037300	2540 INSULATING SHEET F30096	M.PART	1
646071500	X-8500 BL PLATE KOC-E40481	M.PART	1
*12AX7EH	TUBE 12AX7EH	KLM-2399/2414/27/28	1
*304X254000	DIGITAL TR UMA9N	KLM-2396/2430	3
*304X254001	DIGITAL TR UMG9N	KLM-2396/2430	4
*304X254002	DIGITAL TR DTC115ESA	KLM-2399/2414/27/28	2

PART CODE	PART NAME	NOTE	Q'TY
*304X254003	TR NPN 2SC2458	KLM-2399/2414/27/28	2
*312X254000	LED DISPLAY TOD-4201FMRL-B P	KLM-2396/2430	1
*312X951G03	CHIP LED 12-21SRC/TR8	KLM-2396/2430	2
*313X254000	LCD DLC-90086N	M.PART	1
*315X150003	LED MSB31DA-1	KLM-2396/2430	12
*315X254000	DOUBLE DIODE DAN202U	KLM-2396/2430	8
*315X254000	LED MAA4361F (ORANGE)	KLM-2399/2414/27/28	1
*315X254001	DOUBLE DIODE DA204U	KLM-2396/2430	1
*315X254002	DOUBLE DIODE DA227	KLM-2396/2430	2
*315X254004	DIODE 1S4	KLM-2429	1
*315X254005	DIODE 1A2	KLM-2429	6
*320X254000	IC NJM4556AD	KLM-2399/2414/27/28	3
*320X254001	IC MAX334EPE	KLM-2399/2414/27/28	1
*320X254002	IC NJM-7906FA	KLM-2429	1
*362X254000	VR R1103N13A1-B10K	KLM-2396/2430	10
*362X254001	VR RK09L12B0 10KAX2 L=15MM	KLM-2399/2414/27/28	1
*362X951G02	VR R1626N1AP4 10KB-11CC	KLM-2396/2430	2
*375X254000	TOUCH SW EVQPE105K	KLM-2396/2430	15
*375X254001	BINARY SW BTDS20V-116-F27.5-5	KLM-2396/2430	1
*400X254000	CUSTOM TRANSFORMER P116LW1698	KLM-2399/2414/27/28	1
*402X254000	SOLID INDUCTOR BLM21PG600SN1D	KLM-2396/2430	11
*402X254000	CUSTOM COIL P191LW1700 148MH	KLM-2399/2414/27/28	1
*402X254001	SOLID INDUCTOR BLM18BD102SN1D	KLM-2396/2430	3
*402X254002	EMI BEAD BL01RN1A1D2B	KLM-2399/2414/27/28	13
*402X254003	EMI BEAD WBR6H-3T-H5B	KLM-2399/2414/27/28	4
*402X254005	INDUCTOR TC-221M-1	KLM-2429	1
*405X254000	AC ADAPTER KA-161EV 100V	M.PART 100JP	1
*405X254001	AC ADAPTER KA-163EV 120V	M.PART 117EX	1
*405X254001	AC ADAPTER KA-163EV 120V	M.PART 117US	1
*405X254001	AC ADAPTER KA-163EV 120V	M.PART 117CN	1
*405X254002	AC ADAPTER KA-165EV 240V	M.PART 240AU	1
*405X254003	AC ADAPTER KA-169EV 230V	M.PART 230GE	1
*405X254003	AC ADAPTER KA-169EV 230V	M.PART 230FR	1
*405X254003	AC ADAPTER KA-169EV 230V	M.PART 230UK	1
*405X254003	AC ADAPTER KA-169EV 230V	M.PART 230WG	1
*450X254000	PHONE JACK MJ-073 STEREO(GOLD)	KLM-2399/2414/27/28	2
*464X254000	FUSE 250V/T2.5A	M.PART	1
*471X254000	WAFER JS-1125-03	KLM-2399/2414/27/28	1
*471X254000	WAFER JS-1125-03	KLM-2396/2430	1
*471X254000	CONNECTOR JM37115-L0	M.PART	1
*471X254001	WAFER JS-1125-04	KLM-2396/2430	1
*471X254002	WAFER JS-1125-05	KLM-2396/2430	1
*471X254003	WAFER JS-1125-06	KLM-2396/2430	1
*471X254004	WAFER JS-1125-07	KLM-2396/2430	1
*471X254005	WAFER JS-1125-09	KLM-2396/2430	1
*471X254005	WAFER JS-1125-09	KLM-2399/2414/27/28	1
*471X254006	WAFER JS-1132-03	KLM-2429	1
*471X254007	WAFER JS-1132-05	KLM-2429	1
*471X254008	WAFER JS-1132-08	KLM-2429	1
*474X254000	TUBE SOCKET G2C9-Y 9P	KLM-2399/2414/27/28	1
*475X254000	HARNESS HNS-3294 BOARD IN	KLM-2396/2430	1
*475X254001	HARNESS HNS-3273 BOARD IN	KLM-2396/2430	1
*475X254002	HARNESS HNS-3295 BOARD IN	KLM-2396/2430	1

PART CODE	PART NAME	NOTE	Q'TY
*475X254003	HARNESS HNS-3267 BOARD IN	KLM-2399/2414/27/28	1
*475X254004	HARNESS HNS-3268 BOARD IN	KLM-2399/2414/27/28	1
*475X254005	HARNESS HNS-3269 BOARD IN	KLM-2399/2414/27/28	1
*475X254006	HARNESS HNS-3270 BOARD IN	KLM-2399/2414/27/28	1
*475X254007	HARNESS HNS-3271 BOARD IN	KLM-2399/2414/27/28	1
*475X254008	HARNESS HNS-3272 BOARD IN	KLM-2399/2414/27/28	1
*475X254009	HARNESS HNS-3274	KLM-2399/2414/27/28	1
*475X254010	HARNESS HNS-3296 BOARD IN	KLM-2399/2414/27/28	1
*475X254011	HARNESS HNS-3277 BOARD IN	KLM-2399/2414/27/28	1
*500X051000	INTER CONNECTOR YP L45XH3.8XW2	M.PART	2
*620X254000	X-2540 VR KNOB KOC-H40170-1	M.PART	10
*620X254001	X-2540 KNOB KOC-E40572	M.PART	3
*630C85000	X-8500 SHEET KOC-F40864	M.PART	1
*630C85001	X-8500 REFLECTION SHEET F40863	M.PART	1
*630X254000	X-2540 LCD WINDOW KOC-E40560	M.PART	1
*641X254000	X-2540 PANEL KOC-C30597	M.PART	1
*641X254001	X-2540 SIDE BOARD KOC-C30599	M.PART	2
*641X254002	X-2540 BOTTOM COVER KOC-C30600	M.PART	1
*641X254003	X2540 SIDE CHASSIS L C30601-01	M.PART	1
*641X254004	X2540 SIDE CHASSIS R C30601-2	M.PART	1
*641X254005	X-2540 SUPPORT 1 KOC-C41291	M.PART	1
*641X254006	X2540 VALVE CHASSIS KOC-C30610	M.PART	1
*644X254000	X-2540 GND PLATE KOC-C41304	KLM-2399/2414/27/28	2
*644X254001	X-2540 JACK PLATE KOC-C41303	KLM-2399/2414/27/28	1
*646X254000	X-2540 LCD FRAME KOC-E30303	M.PART	1
*646X254001	X-2540 KEY BLOCK L KOC-E30304	M.PART	1
*646X254002	X-2540 KEY BLOCK R KOC-E30305	M.PART	1
*646X254004	X-2540 VALVE COVER KOC-E30317	M.PART	1